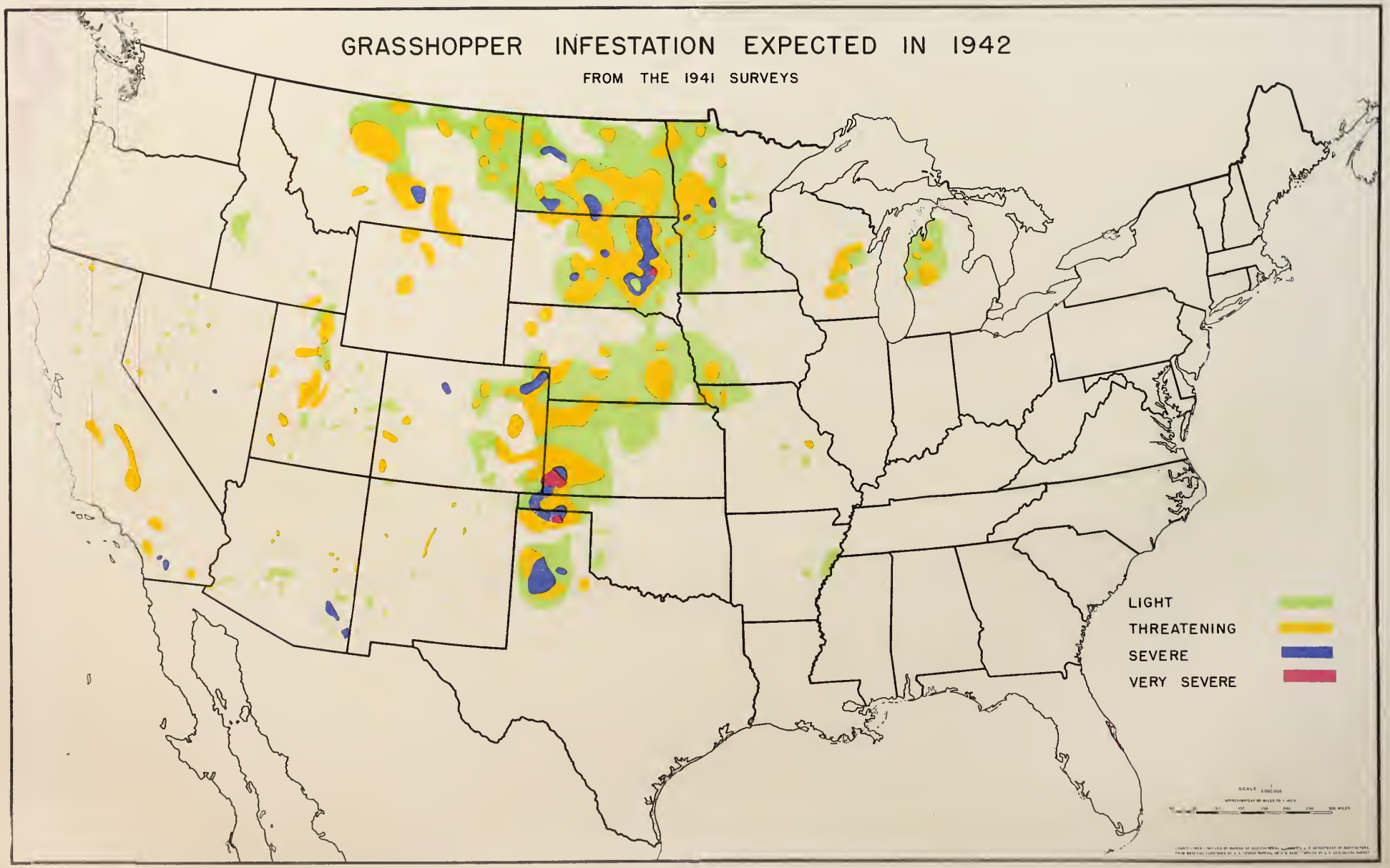
THE INSECT PEST SURVEY BULLETIN

Volume 21 Summary for 1941 Number 10

BUREAU OF
ENTOMOLOGY AND PLANT QUARANTINE
UNITED STATES
DEPARTMENT OF AGRICULTURE
AND
THE STATE ENTOMOLOGICAL
AGENCIES COOPERATING

GRASSHOPPER INFESTATION EXPECTED IN 1942

FROM THE 1941 SURVEYS



BUREAU OF AGRICULTURAL ECONOMICS

Vol. 21 Summary for 1941 No. 10

REMEMBER PEARL HARBOR

INTRODUCTION

Following the general trend of weather for the last 20 years, the year 1941 was warmer than normal in practically all parts of the country, the only exception being a limited area in the interior of the Northeast. The year was also outstanding for heavy precipitation. The latter half of the year was especially wet west of the Mississippi River, and the only States having deficiencies were those from North Carolina and Tennessee northward.

The winter was slightly colder than normal in parts of the Atlantic States, but in all other sections above-normal warmth prevailed, the plus departures being especially large in the western half of the country. From March to May, inclusive, temperatures were slightly below normal in the South and most of the Appalachian Mountain sections, but were substantially warmer than normal throughout the northern half of the country. While most of the western half of the country was well supplied with moisture during the winter and spring, precipitation was subnormal east of the Mississippi River, and drought prevailed in the Middle Atlantic and New England States.

The summer was warmer than normal generally and the fall very much warmer than normal, everywhere except west of the Rocky Mountains, where it was below normal. June brought rainfall generally to the drought area in the East to relieve the agricultural situation, but the rains were not heavy enough to penetrate deep and the subsoil remained relatively dry. Another drought set in the latter part of August, which by the first of October had assumed serious and widespread proportions, covering the entire Atlantic area and extending westward to the central Ohio Valley and Tennessee.

Insects in general passed the winter in the usual abundance. The boll weevil survived in more than normal abundance, and continued so throughout the season. The chinch bug also came through the winter in great numbers, but heavy spring rains in the infested area during the critical period of the insect's development reduced the population, and summer rains further reduced it.

The dry weather in area infested by the Japanese beetle retarded feeding of the larvae and overwintering populations went into hibernation with a low food reserve. The drought also is thought to have had a deleterious effect on the European corn borer.

Rains in the grasshopper-infested area produced wild vegetation which served as food for the young 'hoppers and prevented them from migrating to crop

Because of the abnormally warm weather in the fall many insects continued development later than usual, providing abundant numbers for hibernation.

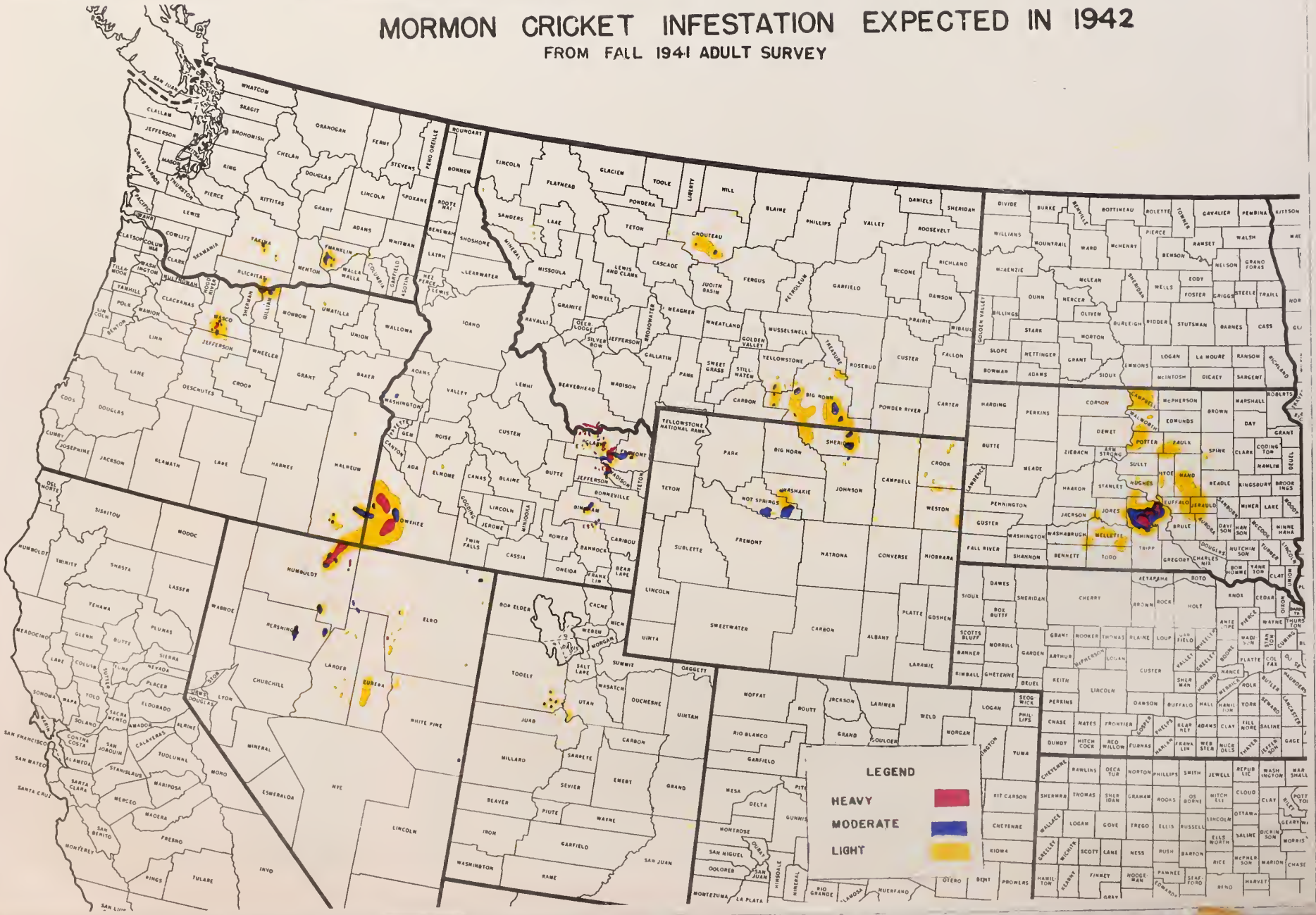
GRASSHOPPERS.--During the summer and fall of 1941 economic numbers of a second generation of Melanoplus mexicanus (Sauss.) developed in southeastern Arizona, southwestern Iowa, northwestern Missouri, southern Nebraska, eastern Colorado, western Kansas, the Oklahoma Panhandle, and the Texas Panhandle as far south as Lynn County. The second-generation area of Nebraska, Colorado, and Kansas had adult first-generation populations ranging from light to threatening. Nymphs of the second generation were first observed in Hamilton County, Tex., on June 23. Most of the hatch occurred during the month of August and was practically completed by September 5. In Kansas and Colorado, as in the 1940 season, many eggs developed rapidly to the point of hatching as early as August 15, then went into an aestivation period which carried them into the usual winter hibernation. Nymphal populations of the second generation reached a maximum about September 5, when populations were found to average 50 per square yard in alfalfa and 75 per square yard on the margins. Relatively smaller populations were found in small grains and weedy areas in crop land in Colorado. Throughout the remainder of the infested area populations in these environments averaged 15 per square yard in the fields and 30 per square yard on the margins. Mortality of nymphs was negligible over the entire infested area and second-generation nymphs developed rapidly, the average nymphal period being 6 weeks, and most of them had reached the adult stage on October 5. Nymphal migrations became general by September 10 and resulted in some marginal damage to fall wheat. Crop damage as a result of nymphal feeding was heaviest in alfalfa. First adults of the second generation appeared about September 1 and more than 90 percent were adults on October 5, approximately 10 days earlier than was the case in 1940 in this area. Flights were first reported on September 10 in Kansas and Texas. The flights were predominantly to the south and southwest, in the direction of the prevailing winds. The most extensive flights occurred on clear days when a northerly wind was blowing. The second-generation flight activity resulted in a general reduction of the populations in Nebraska, northern Colorado, and northern Kansas, and a general increased population in southwestern Kansas, eastern Baca County, Colo., to the Oklahoma Panhandle and most of the Texas Panhandle. Practically no previously uninfested areas, however, were infested as the result of flight. Oviposition became general over the area by October 1 and continued to about November 1 in Nebraska, Colorado, and Kansas, and to November 20 in Oklahoma and Texas. Egg surveys in the southern part of the second-generation area indicate that light to very severe infestations may be expected in 1942.

Aeoloplus turnbullii (Thos.) became reduced by disease to insignificant numbers in Kansas, southern Nebraska, and eastern Colorado. M. differentialis (Thos.) has increased in relative importance by populations building up in the northern part of South Dakota and in localized areas in southern North Dakota and Montana. M. bivittatus (Say) is the predominant species in marginal conditions in large areas in northwestern Minnesota, Montana, North Dakota, south-central South Dakota, and Wisconsin.

Grasshopper surveys conducted in the fall of 1941 indicate that threatening to severe infestations may occur in parts of Colorado, Kansas, Minnesota, Montana, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas. Approximately 29,000 tons of bait have been estimated as needed for these States in 1942 and approximately 3,500 tons have been estimated for 12 other Western and Central States. The total estimate of 32,470 tons for 1942, as compared with

MORMON CRICKET INFESTATION EXPECTED IN 1942

FROM FALL 1941 ADULT SURVEY



an estimate of 46,539 tons for 1941 and an estimate of 118,157 tons for 1940, is indicative of the general decline in grasshopper populations. (R. A. Sheals, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

MORMON CRICKETS.—The size of the known infested area in Idaho has more than doubled. This is due to the inclusion of a large infested area in Owyhee County, which was not surveyed last season. The infested areas are on valuable desert range land and in the vicinity of small hay ranges. In eastern Idaho heavy and moderate infestations near cultivated areas are still present. The total acreage in Montana known to be infested has increased, but heavy and moderate infestations are less extensive than were recorded in 1940. Heavy infestations are located in Beaverhead County, along the Idaho State line, and in Big Horn County. Moderate infestations have developed in Chouteau and Yellowstone Counties. The heavily infested area in Nevada has decreased by approximately 500,000 acres and the moderately infested area in that State has decreased by nearly 400,000 acres. The most serious infestation in that State was the eastern part of Humboldt County.

Significant infestations of Mormon crickets in Oregon were found in the north-central counties of Jefferson, Wasco, Gillian, and Sherman Counties. In South Dakota the moderate and heavy infestations are confined to Lyman County. During the 1941 season banding and migrating of the Mormon cricket was observed. The size of the infested area in Utah is reduced over that of 1940.

Heavily infested areas in Washington are located in Franklin County. In Wyoming a general increase of both heavily and moderately infested areas was observed. More than half of the infested area is in the mountainous and non-agricultural parts of Hot Springs County. Other heavy infestations were located in Sheridan County, although it is not probable that the conditions in this county will be as serious as in 1937, 1938, and 1939. (C. Wakeland, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

EUROPEAN CORN BORER.—In 1941 considerable spread of the European corn borer was recorded west and southwest of the previously infested area in Wisconsin, Illinois, and Indiana, and toward the southeast in Pennsylvania, Maryland, Virginia, and North Carolina, extending the known distribution by 77 counties. In Wisconsin the infestation covers practically half of the State. About the same proportion of Illinois is known to be infested. First records were obtained in 9 counties in eastern Virginia, the infestation appearing in all of the counties along the Potomac River, and in several counties adjoining the older infestation of the State near the coast. European corn borer was also first recorded in Washington, D. C., in 1941, and in 1 county of North Carolina, on the southern border of Albemarle Sound. A detailed report of this insect by A. M. Vance appears in Supplement to No. 9 of Volume 21 of the Insect Pest Survey Bulletin, dated November 8, 1941.

CHINCH BUG.—The hibernation survey made late in the fall of 1940 showed rather heavy infestations of bugs present from northern Indiana to southeastern South Dakota on the north, eastern Nebraska and Kansas on the west, and Oklahoma on the south. Relatively light winter mortality was reported from most of the infested area; however, heavy spring rains in 1941 during the nymphal development period of the first brood materially reduced the rather threatening general infestation to one of local moderate to rarely severe proportions over most

of the area. Outside the regular general chinch bug infested area slight local infestations by the first brood were reported from South Carolina and Mississippi. Heavy but spotted summer rains over most of the infested area apparently further reduced the second brood, but considerable local damage to corn and sorghum by this brood is reported from Missouri, Kansas, and Oklahoma. (P. Luginbill and C. Benton, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

Results of the chinch bug survey conducted during the fall of 1941 to determine the extent and intensity of chinch bug infestations in the States of Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, and Oklahoma indicate that infestations in 1942 will in general probably be considerably lighter than those of 1941. Appreciable infestation still exists in southwestern Iowa, southeastern Nebraska, northeastern Kansas, and northwestern Missouri, with scattered infestations varying in intensity in Oklahoma, Indiana, and Illinois. (R. A. Sheals, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

HESSIAN FLY.--Hessian fly populations were low throughout eastern, north-central, and western Pennsylvania, eastern Maryland, Delaware, northwestern and northeastern Virginia, northeastern Ohio, southwestern Michigan, northern Indiana, southwestern and south-central Nebraska, northwestern Kansas, and northern Oklahoma. There were menacing populations in local fields and areas in most of these regions. Outside of these areas and throughout the major winter wheat Belt general and widespread increase of the hessian fly occurred during the year, extending from eastern Ohio and southeastern Michigan, over the southern half of Indiana and Illinois, across the greater part of Missouri into the eastern two-thirds of Kansas and the southeastern corner of Nebraska. A detailed hessian fly report by W. B. Cartwright appeared in Supplement to No. 6 of Volume 21 of the Insect Pest Survey Bulletin, dated August 15, 1941.

WHITE-FRINGED BEETLES.--Inspections conducted during the 1941 season were confined chiefly to work around the periphery of known infestations and to railroad lines and highways leading out of areas infested by Pantomorus spp. in the States of Alabama, Florida, Louisiana, and Mississippi. One new major infestation was found in the vicinity of Martin, in Dallas County, Ala. Isolated infestations were also found in that State at Ott, in Covington County; Toulminville, Crichton, Monroe, Grand Bay, and Irvington, in Mobile County; and at Flomaton, in Escambia County.

In Mississippi infestations were found for the first time at Brooklyn, in Forrest County; at Purvis and Lumberton, in Lamar County; and at Wiggins, in Stone County.

In Louisiana infestations were found in Covington, in St. Tammany Parish; and on Avery Island, in Iberia Parish.

These new infestations in the four affected States involve a total of approximately 9,450 acres. In addition to findings reported above, slight extensions of practically all areas of infestations found in previous years were recorded. The newly discovered areas in which infestations were found for the first time during 1941, added to previously known infested areas, constitute a total infested acreage, as of the close of the calendar year 1941, of approximately 96,500 acres. Inspection within the infested areas during 1941 indicates

a general reduction in beetle population to the point where economic damage to crops was very slight during the year. (R. A. Sheals, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

VETCH BRUCHID.--Sweepings in June in the known most heavily infested area west of the Cascade Mountains, in Clackamas and eastern Washington Counties, Oreg., and in Clark County, Wash., indicated that adults were about three times as abundant as they were in 1940. Surveys were made near the margins of the area found to be infested in 1940 by sweeping and examination of hairy vetch pods for eggs.

On the southern edge of the infested area, vetch weevil was found all through Polk County, both along the Willamette River and from 6 to 7 miles east, and west of the Eola Hills, along Highway 99W. In 1940 the weevil was not found along this highway south of McMinnville, in Yamhill County. Our most southerly record, west of the Willamette River, is in Benton County, 8 miles north of Corvallis and 3 miles south of the Benton-Polk County line. The weevil was also found in the northeast corner of Benton County 6 miles northwest of the bridgehead at Albany. This is the first record for Benton County and represents an extension of about 15 miles south of the 1940 findings. East of the Willamette River, in Linn County, the vetch weevil was found 2 miles south of Albany on Highway 99E but not near Tangent, 7 miles south of Albany. Going due east from Tangent, weevils were not found until 2 miles west of Lebanon, near Peterson's Butte and the foothills of the Cascades. None were found 5 miles south of this point, just south of Peterson's Butte. The findings of this survey represent an extension of about 10 miles south of the limits found in 1940.

On the northern edge of the infested area the vetch bruchid was found for the first time north of the Lewis River in Cowlitz County, Wash., at Woodland, but no farther north. On the west bank of the Columbia River, north of Portland, the vetch weevil was found about the same distance north, 3 miles north of Saint Helens, in Columbia County, Oreg., but not in the Nehalem Valley, in the Coast Range. This represents an extension of about 10 miles north of 1940 limits on the Oregon side of the river. (L. P. Rockwood and M. M. Reeher, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

LEGUME WEEVIL.--That fairly heavy oviposition by the legume weevil (Hypera brunneus Boh.) had occurred in alfalfa was indicated by field studies made in December and early in January. Larvae had not yet appeared on January 8. Incubation apparently was being delayed by cool, frosty weather during the above-mentioned period. Cage studies indicated that incubation required a week longer this season than was the case in 1941. A first sampling of sourclover on January 4, revealed a larger population of adults than existed in alfalfa. Owing to this and to general heavy oviposition in December 1941, a tremendous accumulation of eggs resulted, about 400 eggs to the square foot but, as in alfalfa, the eggs had not yet hatched. (W. C. McDuffie, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SUGARCANE BORER.--From January to March 1941, inclusive, there were only 6 days at Houma, La., during which the temperature was freezing or below. There were 21 such days in 1940, only 3 such days in 1939, and from 6 to 8 days per year for these months in 1936-38. As a result, the number of borers surviving

the winter in Louisiana was about normal, being several times greater than in 1940, but somewhat less than in 1939; however, the number of first-generation borers found in fields was about equal to that in 1939. The percentage of joints of sugarcane found bored in Louisiana at harvesttime in 1941 was estimated at 20.16. This estimate is based on a systematic survey conducted jointly with A. L. Dugas, of the Louisiana Agricultural Experiment Station. Estimated percentages of joints bored in the 6 previous years, based on similar surveys, were: 1940, 5.3; 1939, 19.7; 1938, 15.9; 1937, 16.1; 1936, 8.7; and 1935, 8.1. In limited examinations made in southern Florida in September, in cooperation with J. W. Wilson, of the Florida Agricultural Experiment Station, the infestation in the vicinity of Clewiston was found to be somewhat lighter than in previous years, and in the Canal Point area the infestation was somewhat heavier. The infestation in the Fellsmere area was lower than average and it was apparent that the 68 percent larval parasitization by Lixophaga diatraeae Towns. and Bassus stigmaterus Cress. had been a factor in reducing the infestation. W. A. Douglas, in surveys to determine the borer infestation in rice, found the infestation in Texas to be the lowest on record, and the Louisiana infestation to be lighter than normal. (J. W. Ingram, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BLACK GRAIN STEM SAWFLY.--During the summer of 1941 Trachelus tabidus F. was found in greater abundance in southern Virginia than at any previous time and reached within about 10 miles of the North Carolina border. However, surveys of wheatfields in North Carolina showed no signs of it having reached this State. The following tabulation summarizes the results of the survey by counties and shows the average percentage of culms infested in samples taken from several fields in each of the following counties:

Delaware. July 21:	
Kent and New Castle	2
Maryland. July 11 to 22:	
Baltimore	2
Carroll	13
Cecil	.1
Montgomery	23
Washington	3
Pennsylvania. July 11 to 17:	
Franklin	4
Huntingdon	3
Virginia. June 14 to 28:	
Augusta	1
Campbell	10
Caroline	0
Essex	1
Fauquier	2
Halifax	6
Hanover	3
King George	7
Loudoun	5

Virginia. June 14 to 28: (Continued)

Pittsylvania	1
Prince William	2
Rockbridge	2
Rockingham	2
Shenandoah	2
Westmoreland	8

EUROPEAN WHEAT STEM SAWFLY.--On July 11 to 21, 1941, Cephus pygmaeus L. was not found south or west of Frederick and Carroll Counties, Md., where examination of 8 wheatfields showed an average culm infestation of 6 percent. From June 23 to July 17 it spread over most of the eastern half of Pennsylvania. The following tabulation summarizes the results of a survey by counties in Pennsylvania and shows the average percentage of culms infested in samples taken from several fields in each of the following counties:

Pennsylvania. June 23 to July 17:

Adams	5
Berks	8
Bucks	10
Centre	14
Chester	6
Cumberland	8
Lancaster	11
Lebanon	9
Lehigh	10
Lycoming	4
Mifflin	2
Montour	6
Northumberland	7
Perry	3
Union	1
York	4

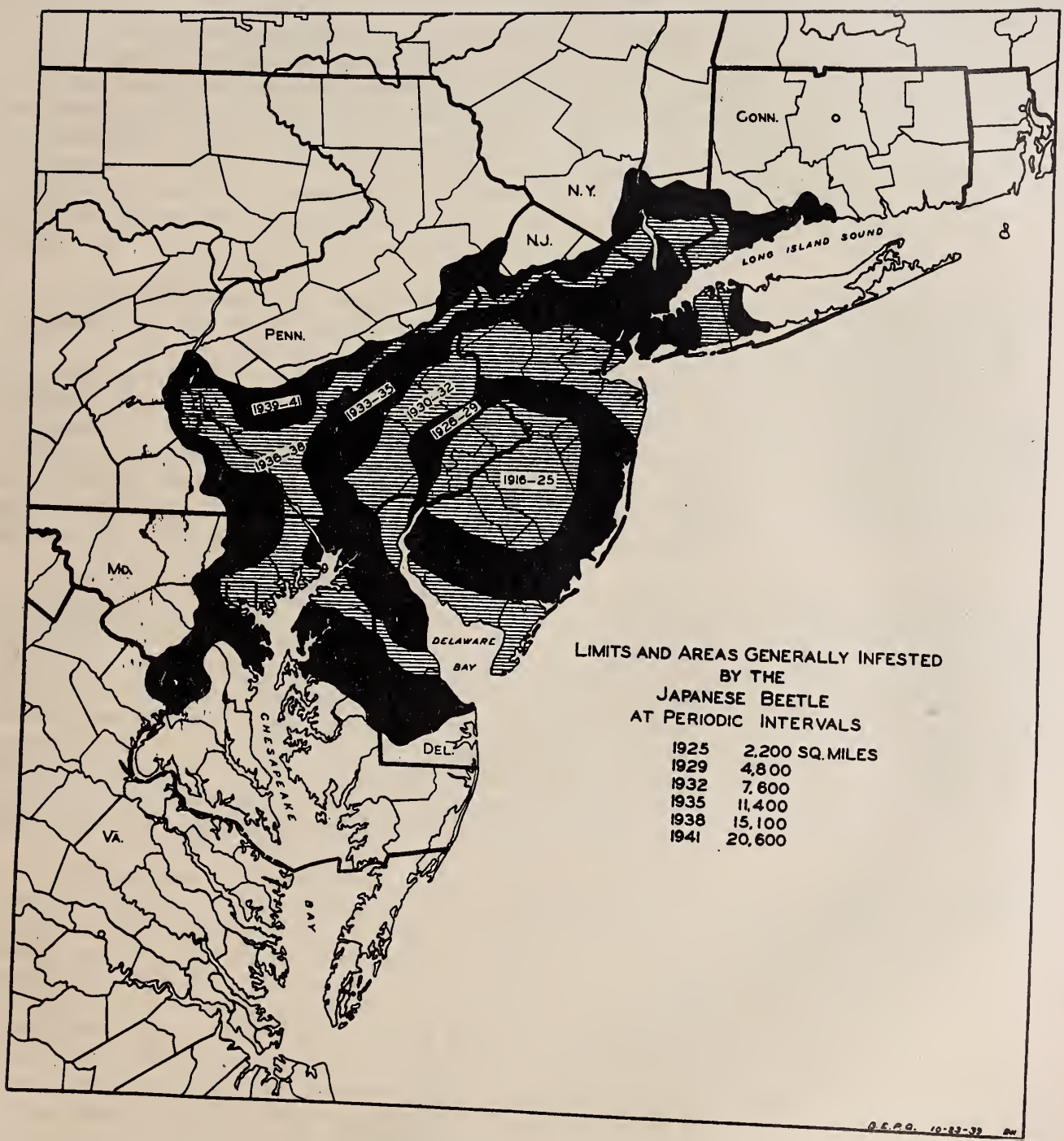
JAPANESE BEETLE.--The 1940-41 brood of the Japanese beetle was characterized by approximately normal spring development of the overwintering brood. Throughout most of the generally infested area abundant and well-scattered precipitation in June and July favored normal pupation and emergence, as well as providing optimum conditions for oviposition of the current brood. Emergence in the Philadelphia area began about the middle of June and was well under way by the first of July. Weather conditions late in June and in July were generally unfavorable for normal flight and feeding activity, particularly in July; during the latter month measurable precipitation was recorded on 17 days, whereas only 10 days were recorded as clear. As a result of these meteorological conditions the usual adult-beetle activity was less apparent. Furthermore, because of rapid foliage growth, beetle injury, while generally developing normally, was much less evident throughout many parts of the generally infested area. Weather conditions generally were unusually favorable for oviposition during July, when normally approximately 90 percent of the eggs are laid. Most of the soil population was in the second instar before drought, which was general throughout the beetle area during the remainder of the year, became acute. Serious drought was general throughout the generally infested area, beginning late in August and extending throughout the remainder of the larval-feeding

period. As a result, late-season larval feeding was much retarded and the overwintering population generally entered hibernation with low food reserve. In this situation if the winter of 1941-42 proves to be unusually severe, winter mortality of larvae is likely to be higher than normal.

Scouting operations conducted during the adult Japanese beetle season in 1941 revealed that the following are some of the more important trends and developments: The most consistent general dispersal appears to be in the southern and southwestern parts of the generally infested area, involving southern Delaware, northeastern Maryland, and York County, Pa. A fairly rapid dispersal is also evident in the extreme northeastern part of the insect's range, an area involving lower New York State and southwestern Connecticut. The most severe infestations were found in the northern half of Delaware, northeastern Maryland, and portions of Chester and Lancaster Counties, Pa. Somewhat less severe infestations were noted in the lower half of Westchester County, N. Y., while locally rather severe infestations appeared at several points in northern New Jersey and in northern Nassau County, on Long Island. Throughout the most of New Jersey, the older infested sections in Pennsylvania, as well as Staten Island and New York City and Brooklyn proper, the infestation was less than that observed in 1939. Two important secondary centers of dispersal were absorbed during the current season, one being the District of Columbia and the area immediately surrounding it, while the second was the New Haven infestation. The survey of a number of important secondary centers of infestation situated relatively close to the area of general infestation revealed the increasing importance of such points as agents of dispersal and as factors in increasing materially the area considered generally infested. In 1941 the area of general infestation was estimated to occupy approximately 20,600 square miles, an increase of 4,300 square miles over the 1939 estimate. This area was distributed among the several States involved, as follows: Connecticut, 620 square miles; New York, 1,722 square miles; New Jersey, 7,431 square miles; Pennsylvania, 6,114 square miles; Maryland, 3,016 square miles; Delaware, 1,550 square miles; Virginia, 85 square miles, and the District of Columbia, 62 square miles. Obvious injury to the foliage of tall trees, although varying widely in intensity and extent, was evident in roughly half of the area considered as generally infested

A graphic periodic summary of the general dispersal of the Japanese beetle from the original center of infestation at Riverton, N. J., is shown on the accompanying map. With the exception of the period 1925-29, all the intervals graphically represented are 3-year intervals. An inspection of this map reveals very clearly that the dispersal has been more rapid in a general south-southeast direction into Delaware, Maryland, and southeastern Pennsylvania, as well as northeast into lower New York and western Connecticut, than it has in a general northwest direction into Pennsylvania. It is evident that the spread was more rapid as the general advance encountered the larger river valleys, particularly the Susquehanna, the Delaware, and the Hudson. The extensively traveled highways extending south of the heavily infested areas also appear to have played an important part in accelerating the rate of dispersal in that direction. (C. H. Hadley and T. N. Dobbins, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

CODLING MOTH.--Winter survival of codling moth was high everywhere except in Delaware, where the mortality was approximately twice that usually recorded. Emergence of spring-brood moths was considerably in advance of last year and


CONN.
N.Y.
N.J.
LONG ISLAND SOUND
PENN.
1939–41
1935–35
1930–32
1926–29
1916–25
MD.
DELAWARE
BAY
DEL.
CHESAPEAKE
VA.
BAY
LIMITS AND AREAS GENERALLY INFESTED
BY THE
JAPANESE BEETLE
AT PERIODIC INTERVALS
1925 2,200 SQ. MILES
1929 4,800
1932 7,600
1935 11,400
1938 15,100
1941 20,600
B.E.P.Q. 10-23-39 BW

began on April 14 in Washington; the last week of April in Delaware, Georgia, and Indiana; the first week of May in Pennsylvania, Maryland, Virginia, West Virginia, Kentucky, Ohio, Missouri, and Kansas; and on May 8 in New York. In New Jersey and Pennsylvania cool, wet weather during June and July partly offset the early development and made conditions favorable for control of the first brood. In general, the season was favorable for codling moth development and warm, dry weather of August and September caused a rapid build-up of second and third broods. Codling moth injury appeared to be less than usual in Delaware and Washington, generally not severe in well-sprayed orchards in Kansas and Missouri, moderately severe in New Jersey, and unusually severe in Virginia, Georgia, Arkansas, Ohio, Kentucky, Indiana, and Illinois. A high population of larvae went into hibernation quarters late in the season as a result of the favorable weather for build-up.

PLUM CURCULIO.--The mortality of hibernating plum curculio adults at Fort Valley, Ga., was unusually low. The first-brood infestation was heavier than that of last year and the larvae left the drops earlier. Curculio development was somewhat earlier than normal and peach development somewhat later. As a result, the midseason varieties of peach, as well as the later varieties, were subjected to a heavy infestation by larvae of the second brood and the hibernating population was heavier than normal. Heavy damage to late peaches and plums occurred in Mississippi, the second generation was unusually abundant and the infestation in Elbertas was high in Kentucky, and in Ohio the infestation was unusually abundant in peach and also occurred in plums.

MEXICAN FRUITFLY.--The annual influx of adults of the Mexican fruitfly (Anastrepha ludens Loew) appeared in the citrus groves of the Rio Grande Valley, as usual, during the late fall and early winter of 1940, following the dispersal from its native host, Sargentia greggii, through northeastern Mexico of the largest population on record. The first larval infestation of the 1940-41 fruit season was found on November 15, 1940, but no further fruit infestation occurred until February 12, 1941. After March 1, 1941, fruit infestations were disclosed in all districts except at Laredo and in the Winter Garden area. The largest number of adults and larval infestations occurred in the western end of the lower Rio Grande citrus area, as has been noted in previous years.

The season was apparently below normal with respect to the number of adults trapped and larval infestations found in the groves. A total of 979 flies was trapped during the 1940-41 season, as compared to 6,157 during the 1939-40 season and 13,687 during the 1938-39 season. Owing to unfavorable weather conditions, the harvesting season for grapefruit and oranges was extended to May 31, 1941, but despite this extension larval infestations were found on only 552 properties during the season. During the 1939-40 season, 582 larval infestations were disclosed, and 2,141 were found during the 1938-39 season. The host-free period began on June 1, 1941, with the tree-to-tree clean-up, and the population of adults dropped immediately. No adults have been trapped since August when 3 flies were captured at Laredo. There was no further spread of the Mexican fruitfly during the season.

The 1941-42 fruit season began with apparently a complete absence of flies from the groves. For several years adults have shown up in the groves in November and December, but in November and December 1941 no flies were trapped

in the entire area. From observations it is known that a small population of Mexican fruitfly developed last summer in northeastern Mexico, and this is no doubt reflected in the continued absence of flies from the citrus groves in Texas during the present season. (P. A. Hoidale, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BEET LEAFHOPPER.--September surveys of representative summer breeding areas in southern Idaho in 1940 showed the largest fall population of beet leafhoppers recorded during the last 4 years. The acreage of Russian-thistle, the most important summer breeding host, was below normal but generally in good condition with very little premature drying. Fall surveys in the Sailor Creek sagebrush area, one of the important overwintering and spring breeding areas, showed the largest late-fall population of beet leafhoppers since 1937. Above-normal temperature and excessive precipitation in September 1940 were very favorable for fall germination of the fall and winter host plants of the beet leafhopper throughout southern Idaho. This early fall germination occurred before the summer host plants had matured or were killed by frost; consequently, there was no break between the summer and fall host-plant sequence. The winter of 1940-41 was, in general, comparatively mild with a slight deficiency in precipitation. The lowest temperature recorded was 1° below zero, which occurred at a time when the soil was protected by a blanket of snow and indicated that weather conditions were favorable for survival of the beet leafhopper and its winter host plants. Spring surveys in the spring breeding areas showed the largest population of overwintered beet leafhoppers recorded since 1938. Excessive precipitation in April added sufficient soil moisture to stimulate growth of the widespread and abundant spring breeding host plants. The number of leafhoppers in the spring movement in 1941 was approximately two-fifths larger than in 1938, 17 times larger than in 1939, and one-third larger than in 1940. Surveys of commercial beanfields in July showed that curly top injury to beans ranged from 1.0 to 59.75 percent, with an average of 12.88 percent in the garden varieties grown for seed and from 0 to 58.25 percent, with an average of 10.22 percent in the Great Northern, a dry-bean variety grown extensively in southern Idaho. Fall populations of the beet leafhopper in southern Idaho in 1941 were the lowest recorded since the institution of the extensive fall population survey in 1934. This was due in part to the lowest recorded equivalent acreage of Russian-thistle during the last 7 years. Russian-thistle, the most important summer breeding host, has been partially or entirely replaced by downy chess, a non-host, over large areas. Seasonal study on the development of the beet leafhopper on summer host plants shows a gradual decrease in leafhopper populations since about the middle of July. Dissections of fall-collected females from representative summer breeding areas showed that the percentage of parasitization ranged from 7.6 to 45.2 percent, with an average of 27.6 percent. Although this indicates that parasites were a factor in limiting reproduction of the beet leafhopper, their effect would not be sufficient to account for the gradual decrease in populations during the latter half of the active season. Patchy germination of fall and winter host plants occurred about the middle of August as a result of heavy local showers during the month, but there was a very poor survival of these weeds during September and October. A generally widespread germination occurred about October 26 and, as a result, the leafhopper entered the winter of 1941-42 under favorable conditions. (J. R. Douglas, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

Normal fall populations of beet leafhoppers were present for hibernation in the northern Utah breeding areas in 1940; however, very few survived the winter. With low overwintered populations and adverse weather conditions during April and May a very low spring brood was produced. The long-distance migration coming into Utah from Arizona, southern Utah, and Nevada in 1941 occurred in May. This was 3 weeks later and only 20 percent as large as the corresponding April movement of 1940. The local migration started May 25 in 1941. This was 1 week later and about 4 to 5 percent as large. Only 33 percent of the local migrant leafhoppers were viruliferous. The beet leafhoppers in northern Utah transmitted curly-top disease to 12 percent of the sugar beets and to 7 percent of the tomatoes in 1941, as compared to 65 and 52 percent, respectively, for sugar beets and tomatoes in 1940.

The acreage of Russian-thistle was slightly increased in 1941, but below-normal precipitation during August and September caused much of it to dry up, particularly the dense stands. Beet leafhopper populations produced during the summer and fall of 1941 were 16 percent as large as in 1940. Fall and winter host plants in all areas germinated in October and are in good condition. (Walter E. Peay, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

The beet leafhopper infests fields of beets grown for seed in the fall, both in the Salt River Valley of Arizona and in Mesilla Valley, N. Mex. Very little curly top was found in beet-seed fields of the Salt River Valley late in April 1941 from a small infestation the previous fall. In Mesilla Valley curly top by April 1941 was severe in fields with the thinner stands, resulting from a moderate infestation the previous fall, especially in fields that had not been sprayed for leafhopper control. Infestations of the beet leafhopper, which occurred the fall of 1941 in beet-seed fields of both the Salt River Valley of Arizona and Mesilla Valley, N. Mex., were considered injurious only to the thinner stands. In both districts spraying was done in October to reduce curly top damage. (V. E. Romney, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

In California the spring migration of the beet leafhopper occurred in numbers above the average but was much smaller in magnitude than in 1940. A small second brood developed in the central part of the San Joaquin Valley and moved into the Sacramento Valley during May. Very little damage to sugar beets was reported.

In the central part of the San Joaquin Valley, where early tomatoes are planted close together and grown on stakes, only about 3 percent of the plants suffered damage from curly top. In the remainder of the San Joaquin Valley and Sacramento Valley very little curly top damage occurred on tomatoes. (W. C. Cook, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

PEPPER WEEVIL.---The 1941 season in southern California followed a second warm winter. Numerous live and active weevils were found on nightshade throughout the winter and early part of the spring. Pepper blossom buds were infested in the seed bed before transplanting. Heavy infestations in the field were observed early in June. One field of chili peppers, from plants grown very early in a greenhouse, had many infested pods in June. Two early fields were so badly damaged that they were plowed up. Heavy infestations occurred in fields of chili, paprika, pimiento, and sweet peppers in all pepper-growing areas from San Diego to Ventura. The infestation continued throughout the

season, and in the untreated fields production was reduced to almost nothing. In fact, none of these untreated fields produced more than one-third of the regular crop. Most of the growers, however, treated their fields with a 50-percent cryolite dust, containing 0.5-percent rotenone, which was added to prevent the development of aphid infestations. A very satisfactory pepper crop was obtained in the fields so treated.

There has been a considerable demand in recent years for potted ornamental peppers, especially at Christmas time. A report was received this season of an entire greenhouse full of these plants being so badly damaged by the pepper weevil that all pods were lost, and hence the plants made valueless.

New areas reported infested for the first time by the pepper weevil in 1941 included Temecula, in Riverside County, Calif., and Phoenix, Ariz. (See also report of infestation from Nueces County, Tex. Insect Pest Survey Bull. No. 8, p. 594.) (Roy E. Campbell and J. C. Elmore, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

PEA WEEVIL.--The average pea weevil infestation in the Palouse area of Idaho and Washington as determined from 2,119 weevil-infestation records obtained from the Seed Division of the Agricultural Marketing Service, involving 1,136,322 sacks of peas or approximately 159,085,000 pounds of dry peas, was 4.49 percent. In 1940 it was 4.06 percent. The average for all crops sampled in Washington during 1941 was 4.36 percent, whereas in 1940 it was 4.17 percent. In Idaho the average for all points in the Palouse area for 1941 was 4.96 percent, while in 1940 it was 3.75 percent. These figures show that there was an increase in the average infestation for the region as a whole of 0.43 percent. The increase in Washington for 1941 over 1940 was 0.19 percent, while in Idaho it was 1.21 percent. These increases, recorded in spite of the fact that at least 1,000,000 pounds of dust containing rotenone was used to control the pest, can be attributed to unfavorable weather conditions that prevailed during the dusting season and to the fact that the winter of 1940-41 was the fourth consecutive winter favorable for weevil survival. (T. A. Brindley, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

POTATO PSYLLID.--Surveys on all of the important host plants in Nebraska and Wyoming showed significant increases in abundance of potato psyllids in 1941 from 1940. Initial infestations in May were larger and somewhat earlier than normal. Populations on potatoes growing in cull-tuber dumps in the North Platte Valley of Wyoming and Nebraska reached a peak of 107.4 adults per 100 sweeps on July 2, and after these plants dried up in the middle of July provided an important source of infestation to late plantings of potatoes and tomatoes. On matrimony vine populations reached a peak of 73.6 adults on June 25. On wild groundcherry psyllid adults reached a peak of 15.6 on July 9, as compared with 5.6 at the peak of infestations on July 10, 1940. Infestations on early planted potatoes increased rapidly the first 2 weeks in July and reached a peak of 14.7 adults per 100 sweeps on July 16. The damage to untreated early plantings was 100 percent. Populations on later plantings of potatoes were approximately one-third of that on the early crop, but were about 3 times the number on the same crop in 1940. On tomatoes adult populations reached a peak of 5.6 per 100 sweeps on July 2, but declined to 1.2 on July 23, owing to hot weather. Following this a build-up to 7.3 on August 20 was recorded. A killing frost on September 8, 18 days ahead of the normal time of

first killing frost, prevented a large build-up in September on late plantings of potatoes and tomatoes. Infestations in the high-altitude area at Laramie, Wyo., did not develop until the first week in July, but following this a continuous and enormous build-up occurred, reaching a peak of 34.8 adults per 100 sweeps on August 26, as compared with 84.1, the peak of infestation on September 13, 1940. Psyllid populations reached a high point of 16.4 adults per 100 sweeps on September 5, on dry-farmed potatoes in southeastern Wyoming, as compared with 2.5, the peak of infestation in that area on September 20, 1940. (R. L. Wallis, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

VEGETABLE WEEVIL.--The vegetable weevil, which first attacked tobacco plants in the seedbeds at Quincy, Fla., in 1937, has continued to infest the bed each season. The infestation in 1941 was of sufficient intensity to require control measures on many of the beds. While the effect of these control remedies made it difficult to determine the potential abundance of the pest on plant beds, observations in turnip fields and on other host crops indicated that the vegetable weevil was somewhat more abundant than in 1940.

All observations made prior to 1941 indicated that injuries caused by the vegetable weevil to tobacco plant beds and to newly set plants were confined to the feeding of the larvae. The first instance of the adult attacking tobacco in the field was observed last April, when large numbers were found destroying the outer rows of two newly set shade-grown crops. (F. S. Chamberlin, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

Larvae of the vegetable weevil were observed feeding on tobacco plants in plant beds in Florence County, S. C., on April 10, about 1 week later than in 1940. The larvae were also observed feeding on plant-bed plants near Mullins, in Marion County, S. C., during April, which indicates that the pest may be expected in other tobacco-producing areas of the State. (Norman Allen, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

TOBACCO FLEA BEETLE.--At Oxford, N. C., in grassland bordering a former tobacco field, in the edge of woods, and around old tobacco stalks in a tobacco field, there was a survival of from 18.5 to 42.75 percent of tobacco flea beetles in the hibernation cages. This is approximately the same percentage of survival as noted during the 2 preceding years. Approximately 100 plant beds, located in the various Tobacco Belts of North Carolina, were examined. The usual method of taking 10 ½-square-foot samples in each bed was followed. The average flea beetle infestation per square foot ranged from 0.32 percent in the Middle Belt to 4.94 percent in the Eastern North Carolina Belt. The data from the Border and Eastern Belts were only slightly greater than for the 1940 season, but those from the Middle and Old Belts were slightly more than 50 percent under the 1940 data. Except in a few isolated, early planted fields, flea beetle infestations were unusually light up to the middle of July, when they were approximately the same as during the same period in 1940. Harvest in the experimental plots started July 18. A protracted period of drought during April, May, and June is considered to have been responsible for the low initial populations in the fields. (C. F. Stahl, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

Cage studies of the tobacco flea beetle at Florence, S. C., for the 1940-41 season showed that emergence of the overwintered flea beetles began at least as

early as February 19 and continued through May 12. The average survival for 36 hibernation cages was 9.91 percent. The peak of emergence was between April 1 and 15 and the greatest injury to plant-bed plants took place between April 10 and 20, during a period of abnormally hot weather. Injury to plant-bed plants was unusual, because the type of injury was typical of that caused to field plants when the beetles occur in outbreak numbers. More growers were concerned about flea beetle control in plant beds than during any similar period in the last 5 years. Some injury was inflicted to newly set plants but this was not given as much attention by growers as was injury to plant-bed plants. The beetles did not occur in outbreak numbers on field plants, although some fields were severely injured. This was especially true of late tobacco. (Norman Allen, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

The tobacco flea beetle was more abundant during 1941 in the Florida-Georgia tobacco district than in the last two seasons and required a larger number of insecticidal applications for commercial control. (F. S. Chamberlin, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

POTATO FLEA BEETLE.--The unseasonably early warm weather in the Connecticut River Valley caused tobacco to be set early, before the appearance of potatoes, and the newly set plants were heavily attacked by the potato flea beetle (Epitrix cucumeris (Harr.)). Dusting with power dusters was, as usual, widely practiced by growers of shade tobacco. Later storms caused a diminution of the population and this did not regain its normal abundance until shortly before harvest, too late for thorough applications of dust. Border dusting, however, was effective in preventing the inward spread of the beetle in most cases and damage was, on the whole, less than normal on the shade-grown crop. On sun-grown tobacco damage was about normal in extent but was less severe in intensity than usual. (A. W. Morrill, Jr., Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BOLL WEEVIL.--The trend toward increased boll weevil damage, which started in the central part of the Cotton Belt in 1940, continued upward in 1941 and extended over most of the weevil-infested area. An abundance of food until late in the season caused above-average numbers of well-fed weevils to enter hibernation in the fall of 1940. This was followed by a mild winter and a high percentage of survival. Conditions were favorable for weevil development and the damage was greater than in any year since 1932 in all States except Virginia, North Carolina, and Tennessee.

The emergence from hibernation cages in 1941, as compared with emergence in 1940, was as follows: Florence, S. C., 9.8 and 0.08 percent; McIntosh, Fla., 17.6 and 11 percent; Tallulah, La., 10.4 and 0.01 percent; Waco, Tex., 14.8 and 0.09 percent. In the spring examinations of woods trash 1,960 live weevils per acre were found at Florence, in comparison with 176 weevils per acre in 1940; at Tallulah, La., 920 weevils per acre in the 1941 examinations and 190 weevils in 1940. Another very reliable index of abundance of overwintered weevils is the collection of weevils from trap plots of cotton. From a 1/5-acre trap plot at Florence, 1,115 weevils were collected in 1941, as compared with only 21 in 1940. Emergence from hibernation was also delayed by early drought in the Southeast, and a larger proportion of the weevils than usual emerged after squares were available for food and conditions favorable

for multiplication. Rains in areas west of the Mississippi River delayed planting and fruiting of cotton and made conditions extremely favorable for a rapid build-up and a sharp upturn in damage to the 1940 crop.

Another factor that contributed to the increase in damage was the shortage of calcium arsenate and dusting machinery during the critical period for control. The shortage was particularly severe in States east of the Mississippi that had not been dusted extensively in recent years and did not have dusting machines or insecticides on hand. At Florence, S. C., the average increased yields from plots dusted with calcium arsenate was 413 pounds of seed cotton per acre, or 105 percent; at Tallulah, La., 455 pounds, or 46 percent; at Waco, Tex., 459 pounds, or 85 percent. The weevil damage in 1941 was greater than in 1940 in every State and for the Cotton Belt as a whole about equal to the damage caused in 1932.

The numbers of weevils entering hibernation in the fall of 1941 were somewhat spotted but were probably smaller on the average than in 1940. In some sections of the Southeast very little food was available late in the season because of lack of fruiting and fall destruction of cotton stalks. In the middle section of the belt defoliation by leaf worms and prolonged dry weather forced weevils into hibernation early in the season. In sections of Texas protection from leaf worm by arsenicals and continued rains permitted cotton to fruit until late and large numbers of weevils to go into hibernation quarters. (U. C. Loftin, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

COTTON LEAF WORM.--The first reported occurrence of the cotton leaf worm was a nearly full-grown larva, collected in the lower Rio Grande Valley of Mexico, 25 miles southwest of Matamoros, Tamaulipas, on May 9. Larvae were found on June 6 about 225 miles to the north in Calhoun County, Tex., and by the first of July a few fields were being defoliated in the lower Rio Grande Valley of Texas. A separate infestation was reported from Marion County, Fla., on July 12. During the last week in July leaf worms were reported as rather generally distributed throughout southern and south-central Texas and practically all of Louisiana, and as present in the Presidio Valley of west Texas and in northern Mississippi. The appearance of the leafworms in Mississippi was nearly 4 weeks earlier than in 1940.

By the middle of August reports were received of infestations in western Tennessee, the Pecos Valley of Texas and New Mexico, and the Santa Cruz Valley of Arizona. The infestation by this time was general in most of Texas and the southern two-thirds of Oklahoma, and was abundant enough to cause damage in Missouri and Arkansas, and serious defoliation in southern and central Texas.

The infestation in northern Florida remained light and spread slowly. Light infestations that caused local damage were reported from Georgia, South Carolina, North Carolina, and Virginia during September. Moths were reported damaging fruit in Missouri between September 20 and 25, strawberries in Nebraska on September 24, and in Minnesota on October 2. Very heavy flights of moths were reported in Illinois, Massachusetts, and Rhode Island during the first week of October.

The cotton leaf worm caused more damage in 1941 than for several years. Considerable quantities of arsenicals were used for control in Texas, Louisi-

ana, Mississippi, Arkansas, and Arizona, but only local damage was caused in the eastern Seaboard States. (U. C. Loftin, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BOLLWORM.--Bollworm infestations were also very generally distributed and probably caused more damage than in any year since 1938. The first moth emerged from a hibernation cage at Waco, Tex., on April 25. Emergence was completed by the end of May, with 22-percent survival. Bollworm was reported more abundant than usual on corn throughout the United States and resulted in a heavy migration of moths to cotton when corn matured. During August severe damage to cotton was reported from the greater part of Texas, Louisiana, and Oklahoma and on sea-island cotton in Florida. Bollworm damage was apparently associated with aphid infestations and in some cases the bollworms destroyed much of the late crop that had been protected from boll weevils. (U. C. Loftin, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

PERIODICAL CICADA.--Brood XV of the periodical cicada was set up on a few scattered records along the Atlantic seaboard, supposed to have been retarded colonies of Brood XIV. The principal colonies were in Dutchess and Saratoga Counties, N. Y. This year the only confirmed record was Dutchess County, N. Y. the following observation being made by A. T. Williams: "The periodical cicada has been observed generally throughout the Red Hook, Rock City, and Tivoli area of Dutchess County, and its noise has been heard as far south as Manchester Bridge, just east of Poughkeepsie."

A. M. Woodside reported a few individuals from Staunton, Augusta County; Greenwood, Albemarle County; and Afton, Nelson County, Virginia. These are the first records of the brood in Virginia. They also must be retarded individuals of Brood XIV, as they occur in the area covered by this brood.

L. Haseman made the following report: "On May 16, 1941, a single specimen of the periodical cicada was picked up on the street in Columbia, Mo. This is probably merely a stray specimen, although a year ago specimens almost ready to emerge were dug up." The Insect Pest Survey is not able to place this record with any degree of accuracy. It may be accelerated individuals of Brood XVI, which is a doubtful brood, consisting of one colony each in Iowa, Nebraska, and Arkansas. (G. Myers, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SPRUCE BUDWORM.--Although there was no noticeable budworm feeding in jack pine stands on the Chippewa National Forest, areas to the south and west were seriously defoliated. Feeding was also heavy in jack pine stands on the Superior National Forest, in Minnesota, and on the Huron National Forest, in Michigan. White pines and red pines in the understory were almost completely stripped of their foliage.

The spruce-fir form of the budworm caused noticeable defoliation of these species in stands in and adjacent to the Superior National Forest. (H. J. MacAloney, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SPRUCE APHID.--For the first time in several years, heavy defoliation of Sitka spruce by Aphis abietina Walk. occurred along the Oregon and Washington coast during 1941. Many intermediate and suppressed trees were completely

defoliated and killed. Most of the larger trees showed defoliation only in the lower crowns. Some ornamental spruce in the Puget Sound area were severely damaged. (F. P. Keen, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SMALLER EUROPEAN ELM BARK BEETLE.--New records showing the presence of the smaller European elm bark beetle show increases in the distribution range over those cumulative to the end of 1940. Most of the records are peripheral extensions, although some records, notably those in New York State, are outstanding additions to the known beetle-infested regions. Recent collections from areas in New York State include areas in Broome and Chenango Counties affected by the Dutch elm disease.

Indianapolis, Ind., hitherto not known to have been infested, after many examinations and considerable efforts to trap these beetles had failed to indicate their presence, was found to have a few colonies of the species in one piece of elm material and is therefore in the present distribution range.

Harford County, Md., north of Baltimore, was found to have infestations. A heavy infestation was also found in Kent County, Md., on the Eastern Shore.

Expansions in the known distribution range in northern Virginia, West Virginia, and other States in the Ohio River Valley show not unexpected marginal increases in this region. (C. W. Collins, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

The smaller European elm bark beetle is becoming more prevalent in the watershed of the Ohio River, where the phloem necrosis disease of elm is active. The killing of elms by this virus disease furnishes large amounts of breeding material suitable for Scolytus. This results in a rapid increase in the numbers of beetles. Columbus, Ohio, offers an excellent example. The insect was first recorded in Columbus in 1939 in one section of the city. At present most of the trees killed by phloem necrosis in all sections of the city are very heavily infested. Other disease areas in Ohio and ajoining States present a similar situation. This condition presents a serious situation in respect to the spread of the Dutch elm disease already found in several localities in Ohio. (D. E. Parker, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

MOUNTAIN PINE BEETLE.--Surveys conducted during the past season show that, although infestations of the mountain pine beetle (Dendroctonus monticolae Hopk.) are present in all white pine stands in the northern Rockies, no devastating epidemics exist at this time. Potentially dangerous infestations are present in the Coeur d'Alene, Kaniksu, and Clearwater National Forests. The annual loss of white pine resulting from the attacks of this destructive forest enemy have averaged approximately 90,000,000 board feet, or nearly one-fourth of the volume cut for lumber. (J. C. Evenden, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

A flare-up of the mountain pine beetle in the white pine stands of the Washington Cascades was evident this year. Commercially, white pine is not a valuable species in this area; however, it is of considerable aesthetic value, especially in Mount Rainier National Park, where a pine-beetle-control program has been in effect many years. (R. L. Furniss, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

WESTERN PINE BEETLE.--In Oregon and Washington the western pine beetle (Dendroctonus brevicomis Lec.) continues to be the primary agent of insect-caused depletion of ponderosa pine. However, the situation in 1941 was markedly improved over that of the last few years. Heavy infestations were very much localized, rather than general, in the two States and the trend of the losses was downward from those of 1940. Except for the Warm Springs Indian Reservation, where a small maintenance-control project in connection with a C. C. C. camp was again undertaken, there were no areas demanding direct control measures. (J. M. Whiteside, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SOUTHERN PINE BEETLE.--In 1940 this insect continued to be destructive and killed considerable pine, principally shortleaf, Virginia, and pitch, in the mountains of North Carolina and Tennessee, particularly in the Pisgah National Forest and in the Great Smoky Mountains National Park. Only a few small kills were observed in the mountains and in the Piedmont of the Carolinas in 1941, thus indicating a marked decrease in bark-beetle populations. (C. H. Hoffman, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BLACK HILLS BEETLE.--Infestation by the Black Hills beetle (Dendroctonus ponderosae Hopk.) continued at a generally low ebb in the central and southern Rocky Mountain region with the exception of northern Utah. On the Powell National Forest intensive control work conducted during the winter of 1940-41 cleaned up the infestation on all except one small area that had to be left untreated because the severe winter delayed spring treating. On the Wasatch National Forest in northern Utah, approximately 18,000 infested lodgepole pines were cut during the winter of 1940-41. This work resulted in a substantial reduction on the treated areas. The fall survey showed approximately 41,000 infested lodgepole pines on the Wasatch and 7,500 on the adjoining Ashley National Forest. Serious infestation on the latter forest was evident this year for the first time in recent years. Large control projects are now being conducted against both the Ashley and the Wasatch infestations. (R. L. Furniss, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BARK BEETLES.--Recent surveys have shown that in the general total the volume of timber killed by bark beetles in California declined measurably during 1941. However, this trend does not apply to all species of beetles nor to all areas. The largest reduction of timber losses came in ponderosa pine as a result of decline in western pine beetle populations. This condition occurred for the most part on timber on the poorer sites where losses have been heavy in recent years. Areas where losses 5 years ago ran as high as 300 board feet per acre show losses for 1941 of less than 50 board feet per acre; however, in some of the better sites, where losses have been negligible in recent years, a spectacular grouping of western pine beetle attacks occurred in 1941. Most of this occurred in widely isolated groups of 15 to 25 trees and did not result in heavy losses.

Contrary to this trend, the Jeffrey pine beetle, which is responsible for severe losses in Jeffrey pine in northeastern California, continued the momentum of its recent infestations. Certain areas in the Plumas National Forest recorded 1941 losses of 300 board feet per acre. The mountain pine beetle, attacking sugar pine on the better sites, showed in general a decline similar to that of the western pine beetle. Various reasons have been ascribed as the cause of this decline. One explanation is the period of improved precipitation

and tree growth preceding the 1941 season. Another is the shortening of the period of seasonal activity in 1941, owing to a very late cold spring and abnormally low temperatures during the summer. Because of these weather conditions the western pine beetle failed to complete its normal number of seasonal generations. At the higher elevations, where the mountain pine beetle produces normally one complete seasonal generation, the broods failed to emerge during the summer and fall of 1941 and carried through into the winter period. This condition also applied to the Jeffrey pine beetle in the higher elevations, but general momentum of the epidemic was such that there was no marked decrease in timber losses.

Other forest insects in this region were somewhat erratic in behavior during the season. One of the more striking events of 1941 was the appearance of extensive killing of natural reproduction in burns resulting from an epidemic of a weevil, Cylindrocopturus eatoni Buch. (J. M. Miller, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

LARCH SAWFLY.--The larch sawfly was reported first from the Flathead National Forest, near the Canadian border, in 1933. It is believed that prior to that time the insect was recorded in western Canada to the north of the Flathead Forest. Since its discovery throughout the northern Rocky Mountains it has spread to the south and west, until at this time there are few larch stands in Idaho and Montana that have escaped defoliation. In some areas the injury has been severe, while in others the insect population has not developed to destructive numbers. (J. C. Evenden, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

A SAWFLY.--Gilpinia frutetorum F. seems to be well distributed throughout New York and the southern half of New England, having been found in many of the older plantations of red and Scotch pine through those areas. Little change has been noted since 1940 in the status of infestations under observation.

Heavy feeding occurred late in the season in one red pine plantation in Southington, Conn. Based on laboratory rearings and dissections of cocoons collected in this infestation, there was an adult emergence between July 1 and September 1, 1941, of about 47 percent, and about 17.5 percent have remained in diapause for hibernation through the second winter.

Microplectron fuscipennis Zett., a cocoon parasite which was imported from Europe and colonized in tremendous numbers throughout the spruce sawfly infested areas in this country and in Canada, has become established in many of the sawfly infestations, particularly in Connecticut. (R. C. Brown, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

GYPSY MOTH.--The hatch of the egg clusters of the gypsy moth in 1941 was variable, owing to abnormal weather conditions. Many of the egg clusters deposited late in the summer and early in the fall of 1940, and some during the first part of October, were subjected to freezing temperatures before embryological development was complete; hence a considerable mortality resulted. Egg clusters that were fully developed before the early cold in the fall of 1940 showed a high percentage of hatch in the spring of 1941. Hatching was 10 to 12 days earlier than normal, and late spring larval mortality occurred in many localities.

In Maine there was a considerable decrease in defoliation during 1941 over that recorded in 1940. In New Hampshire there was almost a 50-percent decrease in the State, as a whole, as compared with the defoliation recorded in 1940. A greater part of the heavy defoliation occurred in the Lake Winnipesaukee section of the State. In Vermont there was a substantial increase over that recorded in 1940. In Massachusetts there was more than a 50-percent increase in defoliation, as compared with that recorded in 1940. In Barnstable County there was a substantial decrease in the number of acres showing defoliation. In Norfolk, Middlesex, and Worcester Counties there was a considerable increase. A moderate increase was noted in Essex, Franklin, Hampshire, and Plymouth Counties, a slight increase in Dukes, Bristol, and Hampden Counties, and no defoliation was noted in Berkshire, Nantucket, and Suffolk Counties. In Rhode Island there was considerable increase in defoliation over that recorded in 1940. In Connecticut no noticeable defoliation was recorded during 1941. (A. F. Burgess, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

BROWN-TAIL MOTH.--During the summer of 1941 there were several reports of defoliation by this insect. In southeastern Maine there were a number of towns in which heavy to complete defoliation was noted. Trees affected were apple, pear, cherry, oak, and elm. In some localities several acres of woodland were defoliated. In the south-central and southeastern sections of New Hampshire many apple and oak trees were completely defoliated, and the infestation was increasing in practically all sections. In northeastern Massachusetts, especially in Essex and Middlesex Counties, complete defoliation by the brown-tail moth in many orchards was noted. Reports from Maine, New Hampshire, and Massachusetts show that the total number of brown-tail moth webs cut by State or local authorities during the winter of 1940-41 was considerably less in Maine, but more in New Hampshire and Massachusetts. In Maine the number decreased from 1,469,000 in 1939-40 to 252,598 in 1940-41. In New Hampshire the number cut increased from 515,000 in 1939-40 to 702,286 in 1940-41. In Massachusetts the number of webs destroyed increased slightly, from 254,000 in 1939-40 to 260,797 in 1940-41. (A. F. Burgess, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SATIN MOTH.--Defoliation by the satin moth in New England increased somewhat over that recorded in 1940. In Maine, New Hampshire, and Vermont no noticeable defoliation was noted. In Massachusetts a few poplar trees in the Cape section of the State were defoliated, while in the northeastern part of the State several trees were partly defoliated in a number of localities. No defoliation was reported from Rhode Island or Connecticut. (A. F. Burgess, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

SCREWWORM.--As indicated by status traps, overwintering of Cochliomyia americana C. & P. was slightly farther north and west of normal on the western Balcones Escarpment, in Texas, and population carry-over was about twice the normal in this area. The development of the spring population was retarded by an abnormally cool March, but developed very rapidly to the highest population recorded since 1936 (date status was begun). An unexpected decline was recorded the latter half of June. The usual July and August decline was not so marke as normal. The fall build-up was far below normal.

The population of C. americana on the Eastern Escarpment has been low all

year to November and December, and is now normal or slightly above. For the first time this area has as many C. americana as the Western Escarpment in these months. The fly did not overwinter on the Eastern Escarpment.

C. americana did not overwinter on the Edwards Plateau and north and west of it. It was reinfested slightly later than normal, but the infestation built up rapidly during May, and June was nearly normal. The July-October population was approximately 50 percent of normal and the November-December population was normal, but very low, and the fly is still present at the end of the year.

The Rio Grande Plain had the highest population of C. americana recorded for the period January-June. The population decreased rapidly to practically none in the fall, and is practically none, or normal, at the end of the year.

The population on the Gulf coast has been low through the entire year, except for a few isolated places near Houston and westward. Apparently only the western part of east Texas became reinfested this year early in May, and this infestation never built up to any considerable extent. Louisiana has not been indicated as infested during the year.

The southeastern infestation was confined to a very small population in central and southern Florida at the beginning of the year, developed a considerable number of cases in Georgia and Alabama during the year, and is practically nothing at the end of the year, as has been indicated by reports. Northwestern Mississippi was infested by a shipment of livestock from Texas early in June and by fall the infestation had spread over several counties into southern Tennessee and a considerable number of livestock were reported as infested in the same localities.

Reports indicate several established infestations of varying degrees of intensity in the Northeastern States by introduction in infested animals. The most extensive of these was centered in southwestern Indiana, southern Illinois, and northern Kentucky.

Reports indicate that northern Texas, Oklahoma, and south-central Kansas were naturally reinfested slightly later than normal, and some rather severe infestations developed in parts of Oklahoma. No reports have been received from others of these States.

Reports indicate New Mexico to have been reinfested on both the west and east early in the season from Arizona and Texas, and infestations became rather severe in local areas, especially about Roswell and Rodeo. Reports and surveys indicate Arizona to have had an unusually severe outbreak during the entire year, and in the Salt and Gila River Valleys infestation was severe until the middle of December.

Reports indicate that C. americana did not overwinter in north San Joaquin or Sacramento Valleys of California. Infestations are indicated light to norma in southern California during the entire year. The first infestation of C. americana ever recorded in Montana was reported, but development of the infestation appears to have been practically nil. A report indicates that C. americana probably infested some animals in southern Utah in August. (D. C. Parman, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

CATTLE GRUBS.--The abundance of the common cattle grub in Texas during 1941 was approximately normal, as compared with other seasons. In the vicinity of San Angelo, Tex., grubs appeared in the backs of animals as early as October 5. In Baylor County grubs were found up in animals on October 25. Reports from the northern Panhandle area indicate that the appearance of grubs in the backs of animals was approximately 2 weeks later than in 1940. In eastern and southeastern Texas the season was apparently somewhat later than usual. (E. W. Laake, Bureau of Entomology and Plant Quarantine, U. S. D. A.)

STABLEFLY.--The first brood of flies emerged from grass deposits about the first of August along Santa Rosa Sound, and there was a sufficient number of flies to serve as parent stock for grass deposits throughout the area. By August 30 the grass deposits along inner bays and sounds showed tremendous numbers of eggs and in the older deposits other stages could be found. At this time the flies averaged from 15 to 25 per animal, and as many as 40 to 50 were observed on man in the vicinity of Tyndall Field. Spray work was undertaken on August 27 and was continued until October 20. During this time the general average for dog flies throughout the control area was less than 2 per animal, while in untreated areas from 350 to 500 flies were observed on cattle.

As a result of a hurricane on October 7, tremendous quantities of marine grasses were deposited high above the normal tide-water marks, which became heavily infested and resulted in two outbreaks. From Carrabelle, Fla., eastward to Saint Marks, cattle averaged 380, pigs 45, and man 60 flies. The second period of high populations was observed between October 21 and 24, when cattle averaged 180, dogs 20, and man 15 flies. The flies breeding in the unusually heavy grass deposits were dispersed by winds so that the population of flies in the control area was increased to as much as 130 for cattle, 15 for man, and 18 for dogs in the vicinity of Port Saint Joe. The occurrence of a hurricane at this particular time emphasizes the high populations of flies that may be expected from tropical disturbances and clearly indicates the need for control of breeding places when such storms occur. In November flies began to emerge from peanut litter left in the fields after the peanuts were harvested, and the emergence continued throughout December. The mild weather during this season of the year permitted such a large emergence during the early part of the winter that the carry-over of immature stages may be smaller than that of last year. Three diseases occurred in mild proportions in northwestern Florida which were somewhat correlated with the occurrence of dog flies. Poliomyelitis was most prevalent in the vicinity of Pensacola, where no control work was undertaken for the dog fly; sporadic outbreaks of hog cholera occurred at different places at inland locations; and encephalomyelitis of horses was present along the salt creeks of northwestern Florida from early in August to the middle of December. (W. E. Dove and S. W. Simmons.)

SALT-MARSH MOSQUITOES.--At Panama City, Fla., and other locations along the coast in northwestern Florida two species of salt-marsh mosquitoes were abundant during the year. Aedes taeniorhynchus Wied. appeared in large numbers during the latter part of June immediately after heavy rainfalls were received, and this species continued to be a pest until the early part of November. Residents of the area cannot remember when mosquitoes were as annoying as they were during this period. During the latter part of August A. sollicitans Walk. was present in large numbers about salt marshes and was somewhat of a pest to Tyndall Field and the residential sections of Panama City. This species was also observed as far as 45 miles from the coast in the vicinity of cases of encephalomyelitis. (W. E. Dove, Bureau of Entomology and Plant Quarantine, U. S. D.